



What is my child
learning in mathematics?

Why learn mathematics?

Mathematics helps us to understand and describe our world. People need mathematics to solve problems and make predictions. Mathematics also develops our abstract reasoning, which encourages us to see things another way, making us more creative.

Mathematics helps us to solve everyday problems, like calculating how long a journey will take and finding the right bus to catch. It helps us to make comparisons when we are shopping between the cost and weight of food or when calculating how much wood to buy if we want to make a backyard shed. It also helps us to understand much of the information we are given every day, and to work out what it means and whether it is fair and reasonable. For example, we may need to calculate how much more we would have to pay in loan repayments on a TV than if we bought it outright, or we may need to understand how superannuation works so that we can choose a plan that best suits us. Understanding mathematics helps us to make better decisions.

In South Australia, students learn mathematics through six strands:

- Exploring, analysing and modelling data
- Measurement
- Number
- Pattern and algebraic reasoning
- Spatial sense and geometric reasoning
- Analysing and modelling change.

What are the SACSA Framework Standards?

In our curriculum, the South Australian Curriculum, Standards and Accountability (SACSA) Framework, Standards give teachers, parents and students an idea of what students are expected to know and do at particular points in their schooling. Standards describe the way each child’s learning improves over time and what they are working towards during their schooling by building on what they already know. Each Standard is roughly equivalent to two school years, as shown in the table below.

Standard 1	Towards the end of year 2
Standard 2	Towards the end of year 4
Standard 3	Towards the end of year 6
Standard 4	Towards the end of year 8
Standard 5	Towards the end of year 10

How can this book help you?

On the following pages you can read the Standards for each of the strands in mathematics to see what is expected of your child. On the next page is a short description of each of the strands.

You can choose to read this book by reading all the strands at each Standard to see how they all work together in teaching children mathematics.

You can also choose to follow one strand through the book and see how it becomes more complex as each Standard builds upon the skills learnt in the previous Standard. In this book, each of the strands is in a different colour. The table below shows you which strands are included in each of the Standards.

Standard 1	Standard 2	Standard 3	Standard 4	Standard 5	
Exploring, analysing and modelling data					
Measurement					
Number					
Pattern and algebraic reasoning					
Spatial sense and geometric reasoning					
					Analysing and modelling change

The six strands of mathematics

Exploring, analysing and modelling data

Students find out about the world by collecting information, solving problems and drawing conclusions. They learn what questions to ask, where to look, how to organise the information and how to explain their findings. They use data to learn about chance in their daily activities. This strand helps them, for example, to compare the price of goods, and to understand why they are unlikely to get a payout on a poker machine.

Measurement

Students find out about the world by measuring and comparing, for example, length, capacity, weight, area, volume, mass, angle and time. They explore why, how and what we measure, so that they can make calculations in order to plan, design and build things. They also recognise when it is useful to estimate a measurement and when it is essential to measure accurately. Measurement helps them not only to plan a trip, but also to build a backyard cubby.

Number

Students find out how numbers help us in understanding the world by learning to add, subtract, multiply and divide. Later they learn fractions, decimals and percentages so that they can use numbers in their daily lives and in other areas of learning. This strand helps, for example, in calculating ingredients for a cake or how to understand a bank statement.

Pattern and algebraic reasoning

Students look at the many patterns in our daily lives. Being able to recognise and use patterns to explore situations, solve problems and make predictions helps us to make sense of the world. Later students understand that you can use algebra to represent patterns to work out scientific experiments or predict rainfall based on past weather patterns.

Spatial sense and geometric reasoning

Students learn that our world is made up of shapes and how everything is positioned in relation to everything else in the world. They learn about different two and three dimensional shapes, their angles and how to use them to plan, design and construct things. This helps them to read and draw maps as well as understand, for example, why particular shapes are used in construction.

Analysing and modelling change

This strand of mathematics is only studied at Standard 5. Students understand that the world is, and always has been, constantly changing. Students learn to examine and make models of change so that they can understand its effect. For example, analysing change gives a better understanding of how the stock market works or whether the voting system is fair.

Exploring, analysing and modelling data	Measurement	Number	Pattern and algebraic reasoning	Spatial sense and geometric reasoning
Children begin to collect and organise information by, for example, doing a survey of the ways people get to school. They begin to find different ways to present their findings, such as in graphs or charts. They recognise that sometimes you can't work out answers to problems, but you can predict how often something might happen, for example, how often a sports team might win. Understanding which things you can work out and which things you can only predict helps them when making plans and decisions.	Children recognise that things can be measured in different ways. They consider how things can be measured and what to use when measuring different things. They estimate and find simple ways to measure time and make simple comparisons of the weight, volume and length of familiar objects, for example 'this table is 9 pencils long'.	Children recognise and use numbers up to at least 100. They understand base 10, recognising that numbers have different values when they are in different positions, such as a '4' in 14 and 45. They learn simple adding and subtracting by finding ways to count and combine numbers, like counting in twos and making collections of things, which leads to simple multiplication and division. They use a calculator to explore the ways numbers are related. They recognise coins and can give change by 'counting on'. They start to solve everyday problems using number symbols, for example 'if you have 2 blue bricks and 2 red bricks, there must be 4 bricks in total, which you can write as $2+2=4$ '.	Children recognise that patterns are made by repetition, which they see and hear in dance, art and music. They start to recognise that there are also patterns in numbers and that you can often predict what number comes next. They explore patterns in calendars and regular events and look at the patterns that occur over time, for example, in life cycles, which they might explore by making a timeline of themselves over the last year.	Children explore and identify two dimensional shapes and look at how these shapes appear in three dimensional figures. They look at what happens when you flip or turn shapes, how some shapes are symmetrical and where you find different shapes in the world around you. They explore the relationship of places to one another, draw and interpret simple maps and plans, and compare how things look differently when you draw a 'bird's eye view' of something.

Mathematics

South Australian Curriculum, Standards and Accountability (SACSA) Framework



Exploring, analysing
and modelling data

Students ask more precise questions about the world around them, using questionnaires to collect information and computers to analyse answers. They start to see patterns emerging in their answers when they draw graphs and tables. They also see that there are many ways of presenting information, depending on what questions you ask and what conclusion you want to reach. They explore the likelihood of things happening, such as predicting everyday situations like traffic in the main street. They start to use fractions and percentages to explain their findings, such as there is a 50% chance that we will have to stop for a red light on the way home.

Measurement

Students sort and compare lengths, volumes and weights of everyday objects, describing them using standard measures, such as metres and centimetres; litres and millilitres and grams and kilos. They understand how time is measured using clocks and calendars. They can select an appropriate measuring tool for many simple measures. They estimate and work out perimeter and area using simple measuring tools they have constructed themselves, such as measuring the perimeter of the school garden by joining hands and using their arm spans to estimate, followed by checking with a tape measure.

Number

Students develop their understanding of numbers, including larger whole numbers and fractions. They can add and subtract up to four digit numbers and multiply and divide by 10 and 100. They use simple fractions and decimals and know their times tables up to 10x. They know when to estimate and when it is important to calculate an exact number. They can pay and give change using coins and notes up to \$100 and use their knowledge to make a budget, for example, planning a class party with a limited budget.

Pattern and
algebraic reasoning

Students explore and predict patterns in numbers and shapes so that they can identify and relate these relationships to their everyday lives, such as patterns in house numbers in the street. They can identify changes in their world and record them, for example, drawing a graph to show the growth of a class pet.

Spatial sense and
geometric reasoning

Students find out more about three dimensional shapes by comparing and describing their properties, including lengths and angles. They understand that some lines are parallel and how to measure angles in degrees. They use software to create three dimensional shapes and use shape patterns to explore similarities and differences between shapes. They can plot coordinates on a grid and use drawing programs to create a simple room.



Exploring, analysing and modelling data	Measurement	Number	Pattern and algebraic reasoning	Spatial sense and geometric reasoning
Students investigate the world around them by, for example, writing questions for surveys. They consider which questions and whom to ask, and report their answers in more complex tables or graphs. They make predictions and estimate possible or probable results. For example, by looking at data on weather patterns and previous sales, they can predict how many ice creams might be sold in the canteen.	Students refine the accuracy of their measurements, by selecting the correct standard units and measuring tools. They can estimate and compare perimeters and areas of different shapes, understand basic angles, and the formula for calculating the area of a square or rectangle. They construct 3 dimensional solid objects to measure volume, calculate average temperatures and convert between analogue, 24 hour and digital time. They use their knowledge for practical problem solving, such as calculating the amount and cost of wood to build a planter.	Students find different ways to express the same amount by converting fractions and decimals to one another so that they can compare amounts. They can use large numbers and write decimals to thousandths. They choose to use calculators and software tools when pen and paper methods are inefficient. They can give examples of using number and decimals in everyday life, for example, how much three computer games would cost if they were \$29.95 each.	Students write and use simple rules to solve problems. For example, using a simple equation, they calculate a problem like how long they could hire a paddle boat if they had \$15.00, where the deposit is \$5.00 and the hire cost is \$2.00 per hour.	Students identify and describe the properties of three dimensional shapes, constructing models of shapes and solids, and they learn elementary geometric theories. They recognise how working with shapes translates into the everyday world. For example, through learning about angles, they can understand how to use a compass to find a direction, and by scaling shapes they can see how scales work in maps, plans and diagrams.

Mathematics

South Australian Curriculum, Standards and Accountability (SACSA) Framework



Standard 4

towards the end of year 8

Mathematics

South Australian Curriculum, Standards and Accountability (SACSA) Framework

Exploring, analysing and modelling data

Students investigate issues by researching information or conducting surveys so that they can make informed decisions. They recognise that the questions and number of people asked in a survey will influence the results, which could then be reported in an unfair way. They report their results in graphs or charts, which may be constructed using computer software. They explain how they collected their data and discuss ways they could improve on collecting it. They make predictions and estimate possible or probable results, for example, what the chances are of a footy team winning based on their previous record.

Measurement

Students solve problems involving capacity, mass and volume and use formulae to calculate the perimeter and area of polygons, circles and irregular shapes. They understand standard time zone maps and how distance and time is used to calculate speed. They use measurement to solve practical problems, such as using bus and plane timetables to plan a journey.

Number

Students use squares, cubes and their roots, and understand the relationships between them. They understand positive and negative signs and complete complex mathematical operations in the correct order. They use ratios and calculate rates, such as speed, in real life situations. They can use decimals, fractions and percentages when solving problems, such as calculating profit and loss and the GST payable on an item.

Pattern and algebraic reasoning

Students describe geometric patterns, writing more complex rules to determine cause and effect. They understand that algebra is used to describe patterns and they begin to use symbols, such as α , for unknown quantities. They start to solve simple algebraic equations and apply their knowledge to solve real life problems, such as understanding the relationship of electricity demand to time of year in order to calculate the predicted demand.

Spatial sense and geometric reasoning

Students calculate unknown lengths and angles using geometric theories and further examine the properties of shapes by rotating and constructing mirror images of them. They can plot mapping points on a grid and describe the relationship of the points to one another. Students apply their knowledge to the everyday world, both in the natural and the built environment. For example, they can now investigate how triangles are used to strengthen buildings or what the advantages are of making milk cartons square in cross-section, and they can consider possible alternatives for the future.



Exploring, analysing and modelling data	Measurement	Number	Pattern and algebraic reasoning	Spatial sense and geometric reasoning	Mathematics
Students plan their own experiments and surveys and look at the ways others have done so when researching issues. They check whether the methods they and others have used are fair and accurate, or whether the results are prejudiced or discriminatory. They can explain the range and values of information in charts and graphs. They look at issues and events which might involve a number of chance factors and how this affects the probabilities and likelihood of events, such as how health insurance companies work out their premiums when selling life insurance, based on how many people will live beyond a certain age.	Students can combine their knowledge of measurement and use formulae to solve complex problems found in their community, such as how long it would take to fill a swimming pool with water.	Students are now fluent in using, describing and explaining number systems and operations and can utilise them in other areas of mathematics. They can apply them to real life problems, such as calculating the value of an investment of \$5,000, invested at a rate of 6%, compounded over a five year period.	Students use mathematical models to describe changes in the world around them. For example, they can represent mathematically the path a cricket ball follows when thrown through the air or the course of an airplane on take off. They use computers to create mathematical models of these representations, comparing them for similarities and differences, and using them to solve problems.	Students now have a good understanding of geometry and how it applies to the everyday world. They write theories about two and three dimensional objects. They test their theories by using IT packages to enlarge and reduce objects to see if this affects their properties. They continue to examine how an understanding of geometry helps when planning, designing and constructing objects in the everyday world.	South Australian Curriculum, Standards and Accountability (SACSA) Framework
					Analysing and modelling change
					Students learn to use graphical models to explore and analyse change, empowering them to make valid choices in a constantly changing world. Change may come from environmental, political, economic or cultural actions. Students use information technologies to access and explore a range of sources to collect and report on predictions and plans. For example, they might analyse population data in order to fit a mathematical model to the data. They can then use their model to make predictions, such as when a population will reach a particular number.

This booklet is written for parents and caregivers to explain the mathematics curriculum in all South Australian Department of Education and Children's Services (DECS) schools. The booklet explains and describes the standards children and students can expect to achieve in mathematics, as described in the South Australian Curriculum, Standards and Accountability (SACSA) Framework.

Additional copies are available from local schools or by phoning Curriculum at 8226 4393. Copies can also be downloaded from the SACSA website at <http://www.sacsa.sa.edu.au> under 'About SACSA' or the DECS website <http://www.decs.sa.gov.au> under 'parents & community'.

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